Department of Computer Science & Engineering
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System Requirements Specification
CSE 4316: Senior Design I
Summer 2018

The Brew Crew
D.O.O.M. bot

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Revision History

Revision	Date	Author(s)	Description
0.1	07.10.2018	PD	document creation
0.2	07.10.2018	MD	minor edits to front page and correction of revision history. Also filled in Packaging requirements and Maintanance requirements
0.3	07.19.2018	MD	Added logo
0.4	07.19.2018	PD	Added Performance and Future Requirements

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1 Product Concept

This section describes the purpose, use and intended user audience for the Automated Brewing System. The Automated Brewing System that performs boil management. Users of the Automated Brewing System will be able to release certain ingredients into the five gallon pot at a precise time.

1.1 Purpose and Use

The Automated Brewing System will be a boil management system. The system will have containers filled with hops and the system will be programmed to drop each container of hops into the boiling pot at a specific time. This will repeat for every addition of hops the brew recipe instructs.

1.2 Intended Audience

The Automated Brewing System is designed and intended for a local brew team. The Automated Brewing System will also be available commercially and will be intended for everyday brewing hobbyists, because the system will be programmed for only 5-gallon pots.

Figure 1: X conceptual drawing

2 Product Description

The product our team is designing is an automated brewing system. The mission of this project will be to allow users to brew beer at the push of a button with minimal supervision of the brewing process. The system will include: a heating devcie that is programmed to be on at certain time intervals, solenoid valves that will allow cooling water to pass through a heat exchanger, dumping mechanisms to drop specail grains and hops into a stainless steel kettle, and 6 gallon fermenter.

2.1 Features & Functions

The product will be a brewing system that will be automated as much as possible. Limiting factors will be our budget and the teams experience with automated systems.

2.2 External Inputs & Outputs

The Automated Brewing System will have an external heating device with timing capabilities in order to heat liquids at certain timing intervals. Another external device will be attatched for dumping specialty grains and hops into the heated liquid, which will then be boiled for a period of time by the programmed heating device. Also to be included in the system will be a programmable solenoid valve which will allow cooling water to pass through a heat exchanger to cool the wort.

2.3 Product Interfaces

Attached to the brewing system will be an interactive gui display which will allow the user to start and stop the brewing process.

3 Customer Requirements

The user will have full control of the brewing processes using the given software. This software will have a UI that can be used on both desktops and mobile devices to offer the user an easy experience to brewing. During use of the product, the user will be notified of the current status of the product and be able to continue or stop at any time in case of emergencies.

3.1 Custom Recipes

3.1.1 Description

There will be a function in the UI to allow a user to upload a .txt file containing a recipe.

3.1.2 Source

Customer

3.1.3 Constraints

The recipe must be in a specified format which will be determined at a later date.

3.1.4 Standards

N/A

3.1.5 Priority

Low

3.2 Info Tab

3.2.1 Description

The UI should be simple to use and contain the necessary information on the first tab. Information includes time left on the entire process and temperature. More information will de decided on a later date.

3.2.2 Source

Customer

3.2.3 Constraints

N/A

3.2.4 Standards

N/A

3.2.5 Priority

Critical

3.3 iOS and Android Helper Application

3.3.1 Description

The software will also be able to run on both iOS and Android alongside its desktop counterpart. It will be able to connect to the system via a local wifi network.

3.3.2 Source

Customer

3.3.3 CONSTRAINTS

N/A

3.3.4 STANDARDS

802.11g/b/a

3.3.5 PRIORITY

Moderate

4 Packaging Requirements

Software will be preloaded onto the device and ready to use. Hardware will have some assembly required and no more tha five seperate parts. It will have a large logo affixed to the pot, but for the most part will be undecorated and unpainted to avoid posible poisoning issues.

4.1 Preloaded Software

4.1.1 Description

Once a new product is recieved it should be preloaded with all the software that is required to run it.

4.1.2 Source

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4.1.3 Constraints

There may be a "setup wizard" for the initial booting up of the device. The device itself must be able to hold the softward in long term storage.

4.1.4 Standards

List of applicable standards !!!RESEARCH FURTHER!!!

4.1.5 Priority

Critical

4.2 Some Assembly Required

4.2.1 Description

Since the whole product will be volumeous and thefore will be unweildy to transport we will have it come in smaller peices and movable with easy assembly and disassembly.

4.2.2 Source

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4.2.3 Constraints

The device should be easy to assemble and disassemble. One should be able to assemble and disassemble it using only diagrams in less than 30 minutes.

4.2.4 Standards

List of applicable standards

4.2.5 Priority

Low

4.3 Logo on the Side

4.3.1 Description

There should be some kind of logo on the side.

4.3.2 Source

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4.3.3 Constraints

Whatever material used should be non-poisonous and sturdy.

4.3.4 STANDARDS

List of applicable standards

4.3.5 PRIORITY

Low

5 Performance Requirements

In this project, the brewing process should take about an hour. Before the start of the brewing, the user should provide all of the ingredients that will be used for the boil and place them at the respective positions. Once a recipe has been processed into the system, a timer should be started and process specific procedures at certain time intervals.

5.1 Hardware Performance

5.1.1 Description

Must be able to read recipe and take action at the exact time when needed.

5.1.2 Source

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5.1.3 Constraints

Will be the most time consuming. Must have functional parts that can work for long periods of time and can withstand heat.

5.1.4 Standards

Be able to brew beer for customer satisfaction.

5.1.5 Priority

High Priority

6 Safety Requirements

For this project there are not many saftey hazards but there it is crucial to obtain some brew sanitizer to ensure the brewing is not contaminated. There are other minor hazards like working with boiling water and possibly sharp edges but those are easily handled with common sense. The main hazard that is going to be focused on is

6.1 Brew Sanitizer

6.1.1 Description

Must buy or obtain some brewing sanitizer to cleanse all the necessary material for brewing.

6.1.2 Source

Common sense for brewing.

6.1.3 Constraints

Constraints are not really existent for this, but maybe certain brands are expensive or inefficient.

6.1.4 Standards

N/A

6.1.5 Priority

High priority.

7 Maintenance & Support Requirements

For this product to work it should be machine washable. Software updates should be handled over wifi.

7.1 machine washable

7.1.1 Description

The device should come apart in such a way that the parts that touch food can be placed in the average washing machine.

7.1.2 Source

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7.1.3 Constraints

Many parts of the machine will be electronic. Obiously these should not go into a dishwasher.

7.1.4 Priority

High

7.2 Software Updates over Wifi

7.2.1 Description

The system should detect wifi and automactically update

7.2.2 Source

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7.2.3 Constraints

We need to make sure there are good systems for inputting passwords and things.

7.2.4 Priority

High

8 Other Requirements

Bottling will be an additional requirement for the Automated Brewing System.

8.1 Requirement Name

8.1.1 Description

Detailed requirement description...

8.1.2 Source

Source

8.1.3 Constraints

Detailed description of applicable constraints...

8.1.4 Standards

List of applicable standards

8.1.5 Priority

Priority

9 Future Items

In future brewing projects, we hope to advance the technology of the automated brewing system. We hope to add a recipe book installed with different types of brew that users can choose from. We also would like to come up with ways to process the system faster since it can take a while to complete.

9.1 Future Installments

9.1.1 Description

Possible future upgrades that may be installed to the project once finished.

9.1.2 Source

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9.1.3 Constraints

N/A

9.1.4 Standards

N/A

9.1.5 Priority

Future